

After cholesteatoma removal reconstruction of the canal wall is often necessary. There are several options. Autogenic tissue is first line, but cortical bone and the reimplantation of the posterior canal wall have doubtful results. Due to its bradytrophic nature cartilage has been used successfully in tympanoplasty and with its stability it is a well-established tissue for the reconstruction of the posterior wall. But adhesion forces in the diseased middle ear can cause retraction into the mastoid cavity. Amongst all different types of biomaterials titanium is one of the most accepted foreign materials. A titanium mesh can be formed into a “cage” to rebuild the mastoid and not only the posterior wall. This cage is covered with cartilage plates and chips. Nutritional support reaches the cartilage through the openings of the mesh. Wound healing and epithelialization are shown to be uneventful. The advantage of the cage over a pure canal reconstruction seems to be the anatomical restoration of the mastoid. Results show no exposure of the titanium construction, good epithelialization and acceptable functional results. Interestingly there is a notable risk of cholesteatoma recurrence in the former epitympanum at the typical place of cholesteatoma origin. In cases when major reconstruction is needed and an open cavity (radical cavity) is still not indicated, the mastoid reconstruction using a titanium cage is a good option in cholesteatoma surgery.

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## Biomaterials in middle ear reconstruction (R761)

ID: 761.4

### Tissue-reengineered bFGF-Repair of Chronic Tympanic Membrane Perforations

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**Background:** In 2009, Kanemaru described a new concept of a minimally invasive tympanic membrane repair utilising bFGF (basic fibroblast growth factor), fibrin glue (Tisseel) and a gelatin foam (Gelfoam) scaffold. He recently published a 98% success rate using this technique on 53 patients. We report on our early experiences using his concept in adult and paediatric patients in Western Australia.

**Objectives:** To describe the scientific background and technique for regenerating the tympanic membrane of patients with chronic perforations utilising the tissue growth factor method devised by Kanemaru, and to report on the pilot study in Australia to validate and prove the safety of the Kanemaru technique.

**Method:** Adult and paediatric patients with chronic, dry tympanic membrane perforations undergo otoscopic and audiologic assessment to assess candidacy for the trial. After inclusion, the patients undergo the repair, which involves freshening of the perforation followed by the insertion of a gel foam plug soaked with genetically engineered bFGF;

the gel foam plug is then covered by commercially available fibrin glue (tisseel) to provide a waterproof seal. The tympanic membranes and their healing are monitored otoscopically and audiologicaly at one, two, four, eight and twelve weeks after the repair.

**Results:** 60 patients enrolled in the study, 88% attained a perforation closure with a 3-layered neotympanone and audiological improvement of hearing. Failures were related to postoperative water exposure; pre-existing middle ear infection and URTI post procedure. Mean operating time for the paediatric patients was six minutes (range three to ten minutes) under general anaesthetic and seven minutes in the adult patients (range four to ten minutes) under local anaesthetic.

**Conclusion:** The outcomes of the pilot study are promising with regard to closure rates, hearing outcomes and operating times. The advantages of this procedure are that it avoids invasive incisions, is possible in the majority of tympanic membrane perforations and is a short five to ten minute procedure. The next phase involves combining the bFGF with various scaffolds and compare outcomes and cost-efficiency.

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## Free Papers (F762)

ID: 762.1

### A multi-center randomized controlled trial of soft tissue preservation using a hydroxyapatite-coated abutment in percutaneous bone conduction hearing implant surgery – 1-year clinical outcomes

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**Learning Objectives:** To become aware of the clinical differences of soft tissue preservation surgery with a HA-coated abutment in comparison to the outcomes using the conventional technique.

**Introduction:** Soft tissue preservation using a hydroxyapatite-coated abutment may lead to a reduction in complications in percutaneous bone conduction hearing implant surgery. In this open multi-center, randomized(1:1), controlled clinical trial, eligible subjects were assigned to receive the conventional intervention, a titanium abutment (Cochlear™ Baha® BA300) with soft tissue reduction, or a new intervention, a hydroxyapatite-coated abutment(BA400) with soft tissue preservation. The primary outcome was a combined endpoint which included the secondary outcome measures pain, numbness, peri-abutment dermatitis and skin thickening/overgrowth.

**Results:** 106 subjects were randomized. The difference between the groups after one year of follow-up as measured by the primary efficacy variable was not statistically significant( $p = 0.12$ ) in the ITT population( $n = 103$ ), but was statistically significant( $p = 0.03$ ) in the Per-protocol population( $n = 96$ ). It showed an advantage for the test group, with over twice as many subjects(29%) with none of these important medical events during the first year compared to the control group(13%). Secondary outcome measures, such as surgical time (15 vs. 25 minutes,  $p < 0.01$ ), numbness(90% vs. 69% of subjects experienced no numbness at one year,  $p < 0.01$ ), neuropathic pain (mean score at 3 months,  $1.06 \pm 0.25$  vs.  $1.70 \pm 1.53$ ,  $p = 0.015$ ) and the overall opinion of the esthetic outcome were favourable for the test group. Five abutments with tissue overgrowth had to be changed in the control group versus one in the test group. No significant differences existed in the occurrence of peri-abutment dermatitis(Holgers index). One implant extrusion was recorded in each group.

**Conclusion:** Soft tissue preservation with a hydroxyapatite-coated abutment leads to a statistically significant and clinically meaningful reduction in numbness, neuropathic pain and surgical time, and improves cosmetic outcomes in comparison to soft tissue reduction surgery with a titanium abutment.

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## Free Papers (F762)

### ID: 762.2

#### Findings on 7000 magnetic resonance scans of the internal auditory meatus: To scan or not to scan?

Presenting Author: **Natasha Amirraghi**

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**Learning Objectives:** MRI IAM is a useful tool for the Neurotologist to clarify related symptoms or reassure the patient. Although the VS pick up rate is low, the potential risks of misdiagnosis justify the wide utilisation, as do the high rates of incidental and abnormal findings.

**Introduction:** Vestibular schwannomas (VS) account for up to 10% of intracranial neoplasms. Magnetic resonance imaging (MRI) of the internal auditory meatus (IAM) has been established as the gold standard in VS diagnosis. Numerous guidelines (Sunderland, Charing Cross and

Oxford) advise when to scan, with reported positive results ranging from 0.5% - 4.3%. We reviewed results of MRI IAM for a catchment area of two million over a three year-period.

**Methods:** Registration with the Caldicott guardian was made and permission given to obtain audit data from the radiology. The information and statistics team provided the MRI IAM episodes. We entered the report for each episode from the electronic patient record. This was coded to six separate outcomes. Normal, VS, Cholesteatoma, Incidental, Other and Incomplete.

**Results:** A total of 6978 exams were performed. 96% involved adult (>16 years) patients; 55% female and 45% male. In total, 66.5% ( $n = 4640$ ) were reported as normal, a further 15.7% ( $n = 1097$ ) had incidental findings. The number of new diagnosis of VS was 99 (1.6%), while 3.3% ( $n = 231$ ) scans were incomplete. Additionally, 1.2% ( $n = 89$ ) diffusion weighted scans for investigation of cholesteatoma and 10% ( $n = 726$ ) surveillance of known VS were identified. Twenty-five scans were requested for surveillance of other disease such as facial nerve, external and middle ear lesions. We also noted inappropriate requests for morbidly obese or extremely claustrophobic patients.

**Conclusions:** This is one of the largest reported databases, demonstrating a VS pick up rate of 1.6%. With 66.5% scans reported as normal, the high incidence of abnormal findings, either incidental or not (33.5%) justifies the usage of MRI IAM.

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## Free Papers (F762)

### ID: 762.3

#### Congenital Aural Stenosis: Clinical Features and Long-term Outcomes

Presenting Author: **Tianyu Zhang**

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**Learning Objectives:** There was no significant difference among different diameter of stenotic EAC for cholesteatoma formation, and stenosis of EAC (>4 mm) with cholesteatoma may be a special state of EAC, we named it as blockage of EAC.

**Introduction:** The aim of the present study was to evaluate the clinical features and long-term outcomes of CAS comprehensively.

**Methods:** It was a retrospective review of patients who underwent meatoplasty for CAS at a tertiary referral hospital, from April 2008 to August 2015. A structured form was used to obtain data from patients' anamneses, PTA, HRCT of the temporal bones, operation notes and videos, pathology reports and postoperative follow-up records.

**Results:** A total of 246 meatoplasty were performed on 232 patients in our study. There was no significant difference among different age groups for cholesteatoma formation,